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ABSTRACT

A study examined the question of whether there is a connection between program characteristics and desirable program outcomes (student satisfaction, placement, and job performance ratings). A program evaluation questionnaire, containing over 300 individual items on such program characteristics as teacher certification and experience, instructional objectives, performance standards, community relations, and counseling services, was used to collect data for over 11,000 students and 600 teachers from Maryland vocational programs at the secondary level. In addition, followup supervisor ratings of job performance were available for approximately 800 students. Data from these sources were compiled and analyzed with respect to the relationship between 36 program characteristics (in the areas of advisory councils, administration, public relations, staff, facilities, recruitment, counseling, curriculum, student organizations, and placement services) and the three program outcomes. Relationships between characteristics and outcomes were presented where consistent trends were found and several speculations were made concerning these relationships. Recommendations called for further research involving sufficient samples of students of each sex and race. (A related comparison of four alternative delivery systems for vocational education is available separately through ERIC--see note.) (MN)

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Two Research Studies on Vocational Education Programs

Relationship between Proposed Vocational Program Quality Indicators, Student Satisfaction, Placement, and Job Performance Ratings

FINAL REPORT

Prepared for:

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John A. Johnson, Ph. D.,
Principal Investigator

July, 1981

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Background to the Present Studies

For the past several years, the Maryland State Department of Education's Vocational-Technical Division has been developing, with the help of the Educational Testing Service, a program evaluation questionnaire. The questionnaire is completed by local personnel, students, and members of a visiting team. The items on the questionnaire inquire about teacher certification and experience, instructional objectives, performance standards, community relations, counseling services, and other program characteristics. A copy of this questionnaire can be found in Appendix A.

Because the questionnaire was designed to comprehensively cover all important program characteristics, it is quite lengthy. It is 12 pages long and contains over 300 individual items. A prior study by the present principal investigator (Johnson, 1980) was conducted to help reduce the number of program characteristics down to a central, essential set of categories. This was accomplished by mailing a letter to 50 State Directors of Vocational Education and to vocational education administrators in the District of Columbia and five U.S. territories, asking them for a list of what they considered to be essential indicators of program quality.

Examination of the returns showed 12 common themes or categories of program quality. Briefly, these were: (1) active advisory council and craft committees; (2) effective administration of program policies; (3) written plan for public relations; (4) certified, qualified staff; (5) adequate facilities and equipment; (6) recruitment program with equal access; (7) guidance and counseling services; (8) realistic, competency-based curricula; (9) cooperative education and supervised

work experience; (10) student organizations; (11) placement and follow-up services; and (12) program evaluation.

The first study in this final report describes how the quality indicator research project was used to organize and analyze data already collected with the ETS program evaluation questionnaire. Questionnaire data were available for over 11,000 students and over 600 teachers from Maryland vocational programs at the secondary level.[1] The second study compares four alternative delivery systems for vocational education--apprenticeship, CETA, cooperative education, and industrial training--and examines the relevance of the 12 dimensions of program quality for these systems.

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[1]Thanks go to Leo Lezzer for providing this archival data.

Study I: Relationship between Proposed Vocational Program Quality Indicators, Student Satisfaction, Placement, and Job Performance Ratings

Introduction

The study of program quality indicators drew a distinction between program characteristics and program outcomes. Program characteristics are features of the program itself, such as the teachers, the physical plant, the counseling services, the curriculum, and so forth. Program oucomes include placement rate, student satisfaction, and employer ratings of job performance. The 12 categories of quality indicators identified by Johnson (1980) are all program characteristics.

One concern expressed in the above study was whether there was a connection between quality indicators (program characteristics) and desirable program outcomes. For example, there was nationwide consensus that the presence of an active advisory council is an essential quality indicator; it remains to be seen, however, whether programs with an active advisory council place more students, create high levels of student satisfaction, etc. The present study answers that question by comparing program characteristics with program outcomes.

Method

The items on the Educational Testing Service questionnaire were first sorted into those describing program characteristics and those describing program outcomes. In terms of outcomes, the questionnaire yielded items related to four measures of student satisfaction (with instruction, facilities, counseling services, and student organizations), placement rate for males, and placement rate for females. In addition supervisor ratings of job performance were available for approximately 800 students who had been followed up. These ratings included judgements of job knowledge, quickness

in learning job skills, work attitude, ability to work with others, and overall work performance.

The next task was to sort the items dealing with program characteristics into categories defined by the 12 dimensions of program quality. The content of the items on the questionnaire were such that 10 of the 12 dimensions of quality were represented. Each dimension of quality contained between 1 and 6 subcomponents; this meant that a total of 36 program characteristics--each a proposed quality indicator from the Johnson (1980) study--could be scored from the ETS questionnaire.

The specific assignment of ETS questionnaire items to the 36 program characteristic scales and the program outcome scales is described in detail in Appendix A. Essentially, the following procedure was used. First, only programs for which employer job performance ratings were available were selected for analysis. Job performance ratings were available for 56 programs. Within each program, the number of people who rated that program's characteristics, and the number of program graduates rated by employers varied considerably. Therefore, average ratings of program characteristics and program outcomes were computed.

Pearson correlation coefficients were computed between the 36 program characteristics (quality indicator) scores assigned to each program and the 11 outcome scores. The result of this analysis is a matrix of 396 coefficients, presented in Table 1. Because the program constitutes the unit of analysis, the sample size is $N = 56$. A discussion of this table follows.

Table 1: Relation between Program Characteristics and Outcomes

Program Characteristic	Student Satisfaction				Employer Ratings					Placement	
	Cur	Fac	Cns	Org	Knw	Qck	Att	Inp	Ovl	Female	Male
Advisory Council											
Help Programs	37**	25	13	-11	18	08	-08	-02	12	13	12
Composition	20	09	03	-07	04	-06	-23	-23	-24	27*	15
Meetings	17	13	13	-40**	19	09	-12	-07	19	47**	51**
Communication	15	11	21	-50**	04	-05	-21	-32**	-08	41**	58**
Guidelines	22	16	21	-23	11	06	-16	-13	08	18	14
Administration											
Written Policies	18	02	04	02	-05	05	06	17	03	03	16
Eliminate Biases	-17	-03	-14	-02	-11	-13	-08	13	-18	01	26*
Support Staff	-15	-29*	-20	29*	02	02	09	02	-22	03	-14
Public Relations											
Written Material	11	03	26*	-41**	-05	11	04	-01	-06	09	04
Media Use	-10	-17	22	-18	-02	21	-05	-08	-06	36**	06
Staff											
Certification	-07	-07	16	28*	-02	02	04	16	16	-04	-04
Work Experience	43**	30**	02	-02	08	17	-09	-02	-07	-26*	15
Inservice	-02	-04	10	-22	17	18	07	12	24	-13	08
Professional Orgn.	15	09	26*	49**	05	-09	-12	-03	-18	-08	09
Student Orgn.	-22	-25	-19	12	-22	-11	-13	-13	-24	04	08
Facilities											
Replicates Work Sit.	11	16	-09	-04	-38**	-34**	-20	-18	-13	-15	12
Equipment Inventory	05	04	09	-28*	18	01	-04	-10	-08	-15	07
Safety	24	31*	09	-26*	-03	-08	-27*	-22	-34**	-33*	-09
Accessibility	03	-08	-16	-22	32*	29*	15	24	16	-19	25
Layout	-04	05	15	-54**	11	-09	-09	-02	-11	32*	23
Recruitment											
Outreach	14	-03	04	-09	03	01	-02	-11	-04	08	19
Minority Enrollment	-09	-19	-05	-23	12	15	04	00	02	15	06
Consider Empl. Oppt.	-02	04	22	-12	-12	05	16	27	-01	09	00
Counseling											
Career Planning	-03	-01	04	-07	12	-02	29*	16	24	49**	10
Clear Roles	06	-01	03	10	00	07	17	13	10	-10	-05
Availability	19	25	15	08	-24	-37**	-26*	-25	-29*	-13	16
Job Information	22	15	20	06	-03	-03	21	25	15	37**	05
Number of Counselors	-02	-09	13	-15	23	34**	31*	23	00	42**	-02
Needs Assessment	-19	-09	04	16	-16	-21	-06	-04	-07	14	45**

(continued next page)

Table 1, con't

Program Characteristic	Student Satisfaction				Employer Ratings					Placement	
	Cur	Fac	Cns	Org	Knw	Qck	Att	Inp	Ovl	Female	Male
Curriculum											
Relevancy	-01	-11	-05	-04	01	16	03	11	11	-09	-04
Task Analysis	39**	27*	20	-13	-14	-05	-21	-13	-16	-21	-05
Varied Methods	20	03	23	15	05	04	01	00	10	-13	-15
Outside Resources	12	11	04	-12	-02	01	05	04	13	-05	02
Student Organizations	-18	-16	-22	13	-10	-02	-09	06	-22	11	11
Placemtent Services	33*	03	12	57**	-03	18	10	03	-05	43**	-02

*p less than .05; **p less than .01

Note. Decimal points are omitted from all correlation coefficients. Abbreviations for student satisfaction are as follows: Cur = curriculum; Fac = facilities; Cns = counseling services; Org = student organizations. Abbreviations for employer ratings are as follows: Knw = job knowledge; Qck = quickness in learning new job skills; Att = work attitude; Inp = Interpersonal skills; Ovl = overall rating. A complete description of the scoring scheme for these variables is presented in Appendix A.

Results and Discussion

In a table of 396 Pearson correlation coefficients, about 20 would be expected to reach statistical significance at the .05 level, due to chance alone. To single out only statistically significant correlations for discussion would therefore be unwise. A more profitable strategy would be to use some interpretive judgment and look for consistent patterns of relationships between program characteristics and program outcomes. That means that if all of the subcomponents of a program characteristic were correlated in the same direction (either positively or negatively) with all measures of student satisfaction, this suggests that a real relationship exists, even if a majority of the coefficients do not reach the .05 level of statistical significance.

For example (and this is purely hypothetical), the three subcomponents of Administration might correlate about -.21 to -.24 with the measures of student satisfaction and about .19 to .25 with the employer job performance ratings and placement rate. Although none of these correlations significant in a strict statistical sense, the pattern of negative correlations implies that programs with a highly-rated Administration have lower levels of student satisfaction, but good employer ratings and a high placement rate.

Looking at the data this way, relationships between characteristics and outcomes will be presented where consistent trends are found. The findings are presented for each category of quality indicators separately. No attempt to explain these relationships will be made in this section of the report; that is reserved for the Speculation section. The present section merely describes the findings.

First, 5 of the 10 categories of program characteristics showed no consistent relationships with any of the outcomes. These were: Administration,

Public Relations, Facilities, Recruitment, and Student Organizations. This is not to say that these features are not important; rather, as they were analyzed here, they seemed to have little effect on outcomes.

All five subcomponent scores for the Advisory Council / Craft Committee dimension (Helps Programs, Balanced Composition, Regular Meetings, Communication, Written Guidelines) showed consistent relationships with three of the four measures of student satisfaction and with both male and female placement rate. It would appear then, that in terms of the satisfaction and placement outcomes, the existence of an active advisory council is indeed an indicator of program quality.

Two of the five subcomponent scores for Staff appeared to be related to outcomes. First, in programs where the staff had more work experience and were involved in professional organizations, student satisfaction was higher. Second, in programs whose teachers attended inservice meetings frequently, employers tended to rate the students' work performance more highly. Thus, professional involvement on the part of the teaching staff seems to have a positive effect on the students' education.

Counseling services were related to outcomes in the following ways. The presence of a well-organized system of testing, planning, and record-keeping was associated with a high placement rate (especially for females) and with employer job ratings (particularly of work attitude and working well with others). Next, having counselor roles and responsibilities clearly defined was associated with good job performance ratings, again mostly work attitude and working well with others.

The subcomponents of the counseling dimension dealing with the direct relationship between counselors and students showed several expected, but

one unexpected finding. First, as one might predict, the amount of information counselors gave about job availability was related to student satisfaction, job performance ratings, and placement for females. Next, in programs with a greater number of counselors, job performance ratings were higher, as was the placement rate for females. Then, in an unexpected finding, counseling availability (how often counseling was offered) was positively associated with student satisfaction, but negatively related to all job performance ratings provided by the employers. (Possible reasons for this finding are presented in the Speculations section.) Finally, in programs that stressed assessment of counseling needs, placement rate was higher for both males and females.

Turning to the curriculum, four of the five components were positively related to student satisfaction. In order, these were: using task analysis as a basis for instruction, using varied instructional techniques, using outside resources, and having written objectives available for each course.

Finally, programs with higher ratings of their placement services had a higher level of student satisfaction, and a higher placement rate--but for females only.

Speculations

Overall, it appears that the Advisory Council / Craft Committee, Staff, Counseling, Curriculum, and Placement Services are the program characteristics that have the greatest impact on program outcomes. The relationships between the other dimensions of program characteristics and program outcomes were weak, inconsistent, or nonexistent.

If association between a program characteristic and a desirable

program outcome is a requirement for calling a program characteristic a genuine quality indicator, then only five of 12 proposed dimensions of quality pass the test, and not all of the subcomponents within these five dimensions meet this requirement. Intuitively, one might think that if a majority of state directors for vocational education agreed that a program characteristic is an indicator of quality, that characteristic should be related to desirable outcomes. One possibility why not all of the program characteristics judged important by the state directors as quality indicators were associated with outcomes is that these program characteristics are important for legal reasons (e.g., policy against sex and race bias) or political reasons (e.g., public relations), but do not have a direct impact on variables like student satisfaction or employer ratings of performance. The limitations of the available data were such that only a narrow range of outcomes could be examined. The relationship between program characteristics and other program outcomes[2] could be addressed by future research.

Another reason why relationships were not found between outcomes and all of the program characteristics could be the technical limitations of the study. These are discussed in detail in the following section, Limitations and Suggestions for Future Research. Speculation about the

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[2]Possible outcomes for study are: program completion, demonstrated skill proficiency, job stability, student demand, student job satisfaction, wages, minority enrollment, rate of job advancement, cost/benefit ratios, return rate, active employer recruitment, program reputation in community, referals, endorsement by professional groups, and community support. Negative outcomes would include physical injuries, failures, withdrawals, absenteeism, tardiness, behavior problems, poor social adjustment, and teacher turn-over rate. These outcomes were gathered by Johnson (1980) but not listed in that report.

relationships that were found are now presented.

A full 80 percent of the state directors who contributed quality indicators in the Johnson (1980) study agreed that Advisory Councils and Craft Committees are an integral part of a vocational education program. In that report it was noted that some ambiguity existed on precisely what an advisory council was what its functions were. The term could refer to a state committee serving all of the programs in the state, a local committee serving a school's overall program, or specific committees serving each topical program area with the school's overall program. It is likely that in the present study, it is the local, specific advisory personnel that are having the greatest impact on outcomes. These local personnel have intimate knowledge of the working conditions, practices, and employment opportunities in their fields. It is not surprising that programs that use this valuable information have higher levels of student satisfaction and good placement rates.

Neither was it surprising to find positive outcomes in programs whose teachers had more work experience, were involved in professional organizations, and attended inservice meetings frequently. First, teachers who are professionally active acquire job knowledge that is more extensive, accurate, and up-to-date than teachers who simply teach from old textbooks. This certainly benefits students. Just as important, however, is that professional involvement indicates enthusiasm and a positive attitude about teaching; this is reflected in student satisfaction.

Examination of the counseling dimension showed that overall organization of counseling services was associated with a higher placement

rate and favorable ratings by employers for job performance, especially along the social-interpersonal dimensions (work attitude and ability to work with others). This makes sense in light of a study by Holland, Gottfredson, and Power (1980). Holland et al. suggest that two important functions of career counselors are dealing with general maladjustment and lack of information about jobs. Effective counseling should therefore be associated with (a) good work attitudes and interpersonal effectiveness, and (b) knowing enough about job availability to secure employment. This is precisely what the present study found.

That the availability of counseling is negatively associated with employer ratings of job performance is puzzling. A possible explanation is that in programs in which counseling is always readily available, students develop a dependent relationship with their counselors. Upon graduation they move into a work environment that requires a high degree of independence and self-reliance. In this situations, lower job ratings might be a function of inability to work alone or inappropriate attempts to establish a dependent relationship with the employer. Clearly, more research is needed to determine if this phenomenon indeed exists and why.

It is hardly surprising that the use of varied instructional techniques and outside resources is related to student satisfaction. Students become bored in a class wherein only lectures are used. Having written objectives for the courses was related to student satisfaction, no doubt because students want to know exactly what is expected of them. Finally, an interesting finding is that satisfaction is higher in programs that use a task-analysis as a basis for instruction. Perhaps this is because such programs provide a sequence of training that is accurate and realistic with respect to the actual work environment.

The positive relationship between the quality of placement services and placement rate for females has a simple explanation. That is, jobs in technical fields typically have been more open to men than women. The difficulties females experience in obtaining such jobs can be alleviated with an effective placement service.

Limitations and Suggestions for Future Research

Great care should be taken in interpreting the findings in this report. First of all, the speculations presented here are just that--speculations. A correlation between a program characteristic and a program outcome doesn't even necessarily mean that the characteristic causes the outcome. Both characteristic and outcome could be a function of some third unknown variable.

There are numerous problems in reanalyzing archival data, which means that one should be careful about accepting the validity of the correlations themselves, apart from interpretations. First, there are all of the possible errors associated with having a new programmer and statistician analyze unfamiliar data. The Department of Vocational and Technical Education did provide an interpretive guide, which clearly showed which numbers in the data were associated with what variables. The problem was in merging the evaluation questionnaire data file with the employer rating data file, making sure that the ratings were averaged properly and matched with the appropriate program data set. Spot checks appeared to show that this procedure as accomplished successfully, but with such a complicated process, errors are always possible.

Another problem in dealing with this archival data set was finding enough items to validly and reliably represent the components of the quality indicator dimensions. For two of the proposed dimensions of

quality--Work Experience and Evaluation--no items were deemed adequate for measuring the dimensions. For some of the dimensions of quality, only one or two items were relevant for some of the subcomponents, and some of the subcomponents were not represented at all. It is a well-known psychometric principle that scales with only a few items tend to be inherently unreliable. But with archival data, one has no choice but use what is available.

For the scales that contained an adequate number of items, an estimate of reliability (e.g., Cronbach's alpha) should have been computed. This was not possible, due to limited computer space and funds. One has to accept on faith that these scales are reasonable reliable, based on Block's (1976) claim that average ratings become more and more reliable when more raters are used. The problem here, though, is that in computing average scores for each program, some programs were represented by only a few students, and others, by many. Ideally, each program should be represented by the same number of students, with a sufficient number (at least 30 per program) to allow one to make statistical inferences with confidence.

A final sampling problem concerns race and sex. Originally, the effect of these variables on outcomes was to be examined; however, a preliminary analysis of the available data showed that the sample was predominantly white and male. Statistical inferences using these variables might therefore be misleading; consequently, race and sex differences were not examined. The effect of these variables should be studied in the future, however.

The above technical problems might seem devastating, but the fact that some consistent and meaningful relationships between program

characteristics and outcomes were found indicates that the findings have some validity. If the scoring methods were completely unreliable and invalid, no meaningful patterns would have emerged from the data, yet many patterns were found. These findings should not be regarded as definitive, given the technical shortcomings of the study, but they can be regarded as real.

Several suggestions are offered for extending and improving the present research study. First, if the quality indicator dimensions are to be assessed properly, a new evaluation questionnaire would be required. The new questionnaire would contain items designed specifically to cover the 12 dimensions of quality, with all of their subcomponents. Next, it would be desirable if one assessment team rated all of the programs; this would contribute to the reliability of the ratings. Finally, programs should be sampled such that sufficient numbers of students of each sex and race are represented, so that the impact of these two variables can be assessed. Finally, it would be useful to sample programs other than those found in high schools and vocational schools, to examine the effects of different delivery systems. For a description and comparison of some alternative delivery systems for vocational education, we now turn to the second study.